

AD-A153 095

AIRPORT AND AIRWAY SYSTEM COSTS AND USER COST  
RESPONSIBILITY VOLUME 1 SUMMARY REPORT(U) MITRE CORP  
MCLEAN VA METREK DIV A N SINHA SEP 77 MTR-7610-VOL-1  
DOT-FA69NS-162 F/G 1/5

1/1

UNCLASSIFIED

NL

FILED

1/1

END

FILED

DTIC



AD-A153 095

MITRE Technical Report

MTR-7610

Volume I

# Summary Report: Airport and Airway Costs and User Cost Responsibility

Dr. A. N. Sinha

SEPTEMBER 1977

CONTRACT SPONSOR  
CONTRACT NO.  
PROJECT NO.  
DEPT.

FAA/AVP  
DOT-FA69NS-162  
14080  
W-47

DTIC  
ELECTE  
S APR 29 1985 D  
A

This report was prepared by The MITRE Corporation for the Office of Aviation Policy, Federal Aviation Administration under Contract No. DOT FA69NS-162. The contents of this report reflect the views of The MITRE Corporation, which is responsible for the facts and the accuracy of the data presented herein, and does not necessarily reflect the official views or policy of the FAA. This report does not constitute a standard, specification, or regulation.

METREK Division of The MITRE Corporation  
1820 Dolley Madison Blvd. McLean, Virginia 22101

This document was prepared for authorized distribution.  
It has not been approved for public release.

This document has been approved  
for public release and sale; its  
distribution is unlimited.

85 03 11 181

## ABSTRACT

This document summarizes research performed by The MITRE Corporation and Administrative Sciences Corporation for FAA's Office of Aviation Policy on present and future airport and airway costs and user cost responsibility. Cost projections and allocations are provided for the period 1977-1986. The results are intended as inputs to an FAA analysis of airport and airway system financial policy.

The summary report presents an overview of the study effort and its findings. Specific technical supporting details are presented in the following documents:

1. Airport and Airway Cost Projections: 1977-1986, Part I: Development of FAA Costs, MTR-7610, Volume II.
2. Airport and Airway Costs Incurred in the Public Interest, MTR-7610, Volume III.
3. Airport and Airway System Cost Allocation, MTR-7610, Volume IV.
4. Minimum General Aviation Airport and Airway System Requirements, MTR-7610, Volume V.
5. Review of the 1973 Airport and Airway Cost Allocation Study, MTR-7610, Volume VI.
6. Airport and Airway System Cost Allocation Model: Users' Manual, MTR-7610, Volume VII.
7. Airport and Airway Cost Projections: 1977-1986, Part II: An Econometric Model for Cost Projections, ASC R-112.
8. Airport and Airway Costs Incurred in Servicing Small Communities, ASC R-113.



Section For	
GRA&I	<input checked="" type="checkbox"/>
GRAB	<input type="checkbox"/>
Unfunded	<input type="checkbox"/>
Unallocated	<input type="checkbox"/>
<i>Subm. in file.</i>	

A-1

### ACKNOWLEDGMENT

Contributions to this study were made by a number of persons within the Federal Aviation Administration (FAA), The METREK Division of The MITRE Corporation, and the Administrative Sciences Corporation (ASC)--under subcontract to MITRE. The following persons provided the nucleus of the study team.

FAA: J. M. Rodgers

MITRE: R. L. Fain, D. S. Garvett, R. M. Harris,  
S. E. Koenig, J. C. Scalea, A. N. Sinha

ASC: H. L. Eskew, B. M. Smith

## 1. INTRODUCTION

The Federal Aviation Administration has an annual budget of approximately \$2.5 billion that funds the maintenance and provision of airport and airway services and facilities, provides grants for airport development, and supports regulatory activities in airport safety, environment, aviation medicine and certification of various elements of the ATC System. This report presents projections of these FAA costs and their allocation to users for the period 1977-1986. The results are intended as inputs to an FAA analysis of airport and airway system financial policy.

### 1.1 Background

In response to a Congressional directive in the Airport and Airway Development Act of 1970, the Department of Transportation (DOT) concluded a comprehensive cost allocation study [Reference 1] in 1973. This study covered the period of 1966-1975 and had three major conclusions and recommendations:

1. The allocation of total airport and airway cost was 50% to air carriers, 30% to general aviation, and 20% to the military and the Government.
2. There was a substantial deficit between the allocated costs and revenues, particularly for general aviation.
3. There should be a shift in the tax structure to reflect cost recovery of allocated costs to the users.

The findings of the 1973 Cost Allocation Study and the concept of full cost recovery were disputed strongly by some user groups, especially by the general aviation community. The majority of the user's comments dealt with the cost recovery phase and an opposition to the concept of full cost recovery through increased taxation. Two suggested improvements to the cost allocation phase were repeatedly cited. The first dealt with the identification of costs incurred in public interest to the benefit of the nation as a whole. It was contended that these costs were large and should not be attributed to the users of the airport and airway system but rather to the public sector. The second

## 2. DEVELOPMENT OF THE COST BASE

Projections of FAA costs cover the period 1977-1986. These projections used the cost classifications of the FAA budget categories presented in Table 2-1. Details of the cost projection methodologies and related discussions are presented in Volume II of this report [Reference 2] and in a supporting report prepared by Administrative Sciences Corporation [Reference 8]. Future FAA costs were estimated for two alternative scenarios:

1. Baseline Projections. Existing functional and statistical relationships between system costs and aviation activity levels are assumed to continue in the future.
2. Alternative Projections. Future relationships between system costs and aviation activity is assumed to change as a result of increased controller productivity, reduced equipment O&M costs and increased F&E expenditures associated with new FAA Engineering and Development (E&D) products now under development.

The baseline projections utilize an econometric model based upon empirically derived relationships between capital, labor and aviation activity levels. In those costs areas where such relationships cannot be satisfactorily established, long-run budget trends and other relevant factors (as appropriate) were used to project future costs.

The alternative projections were derived by making appropriate modifications of the baseline projections to reflect both the increases in F&E costs for new equipment, and the resultant decreases in O&M costs. The projected changes in cost relationships are based on expected staffing reductions due to increased controller productivity in addition to planned reductions in equipment O&M due to modernization programs.

The projected ten year costs (FY77-FY86) under both scenarios were estimated in constant FY76 and in current dollars. The results are presented in Tables 2-2 through 2-5. The costs shown treat capital costs

TABLE 2.2  
BASELINE TOTAL COSTS  
FY76 CONSTANT DOLLARS (MILLIONS)

	1977	1978	1979	1980	1981	1982	1983	1984	1985	1986
<b>BB</b>	69.6	74.3	74.3	74.3	74.3	74.3	74.3	74.3	74.3	74.3
<b>FB</b>	43.8	54.4	65.2	97.7	75.9	43.4	54.2	59.5	70.3	75.7
CENTERS	76.4	67.7	80.6	90.0	94.2	79.5	75.3	76.2	73.9	75.4
TOWERS	15.4	9.0	37.9	40.8	42.6	48.0	36.6	41.1	33.9	19.4
TSS	33.9	44.3	63.8	51.5	52.3	47.2	45.5	43.9	42.3	40.9
MAINT	16.9	27.4	27.4	27.4	27.4	27.4	27.4	27.4	27.4	27.4
<b>TOTAL FB</b>	188.4	202.8	275.6	307.1	292.5	241.5	239.1	248.2	247.8	238.6
<b>OB</b>	293.0	297.3	299.1	342.7	321.0	335.3	343.5	353.7	364.9	378.1
CENTERS	181.9	196.7	197.7	206.0	218.5	228.3	233.0	240.7	248.4	257.4
TOWERS	284.6	290.8	300.0	311.9	325.4	339.6	350.4	360.1	369.8	378.8
MAINT	158.4	150.1	155.4	162.2	169.9	178.0	184.2	189.7	195.2	200.4
TSS	107.2	107.2	107.2	105.0	102.9	100.7	98.6	96.5	94.3	92.2
MAINT	37.5	38.2	38.2	38.2	38.2	38.2	38.2	38.2	38.2	38.2
<b>TOTAL OB</b>	1087.6	1099.8	1124.1	1153.5	1205.1	1250.6	1280.0	1311.1	1344.1	1379.4
<b>SUPPORT</b>	136.1	144.3	147.0	150.9	150.7	165.7	170.3	175.2	180.3	185.8
ADM P SI	142.3	150.7	154.7	158.6	163.4	168.5	173.1	176.8	181.7	186.6
ADM RD	8.5	9.1	9.3	9.5	9.8	10.5	10.9	11.2	11.5	11.9
DRY DR	6.7	7.6	7.6	7.6	7.6	7.6	7.6	7.6	7.6	7.6
A-B ADM	18.9	23.6	24.1	24.7	25.0	25.5	26.0	26.6	27.2	27.6
CMT TBN	71.6	81.3	82.9	85.0	88.7	92.0	94.1	96.5	98.8	101.4
DIR, S&S	100.8	106.3	108.6	111.6	117.0	121.6	124.8	128.1	131.5	135.3
<b>TOTAL SUPP</b>	524.9	562.8	574.3	588.8	610.2	631.4	646.8	661.9	678.6	696.2
<b>FB&amp;B</b>	20.3	20.3	20.3	20.3	20.3	20.3	20.3	20.3	20.3	20.3
<b>DTL CAP AF</b>	28.4	28.4	28.4	28.4	28.4	28.4	28.4	28.4	28.4	28.4
<b>GRANTS</b>	490.9	488.6	484.8	479.7	465.7	463.0	461.4	463.7	459.7	455.1
<b>TOTAL</b>	2410.1	2477.0	2581.2	2651.3	2696.5	2709.5	2750.3	2807.9	2853.2	2892.4



TABLE 2.4  
ALTERNATIVE TOTAL COSTS  
FY78 CONSTANT DOLLARS (MILLIONS)

	1977	1978	1979	1980	1981	1982	1983	1984	1985	1986
BED	69.6	74.3	74.3	74.3	74.3	74.3	74.3	74.3	74.3	74.3
PER										
CENTERS	43.8	55.0	49.0	39.0	42.0	43.0	37.0	61.0	103.0	116.0
TOURNS	78.4	76.0	107.0	104.0	107.0	133.0	149.0	122.0	187.0	115.0
PSS	15.4	43.0	49.0	55.0	63.0	57.0	39.0	32.0	17.0	17.0
MAINT	33.9	50.0	73.0	94.0	89.0	71.0	80.0	90.0	86.0	62.0
OTHER	16.9	26.0	28.0	25.0	27.0	29.0	32.0	38.0	31.0	35.0
TOTAL PER	188.4	250.0	306.0	337.0	328.0	333.0	337.0	343.0	354.0	345.0
OSR										
CENTERS	293.0	297.3	299.1	302.7	300.0	298.1	283.9	276.3	244.9	230.6
TOURNS	181.9	190.7	197.7	206.0	218.5	228.3	233.6	240.7	248.4	257.4
PSS	284.6	290.8	300.0	311.9	316.0	320.2	321.3	321.6	316.2	315.6
MAINT	158.4	150.1	155.4	162.2	169.9	178.0	188.2	189.7	195.2	200.4
OTHER	107.2	107.2	107.2	105.0	102.9	100.7	98.6	96.5	94.3	92.2
TOTAL OSR	37.5	38.2	38.2	38.2	35.7	33.1	30.6	30.6	30.6	30.6
TOTAL OSR	25.1	25.6	26.5	27.6	25.3	22.9	20.0	20.9	28.9	22.9
TOTAL OSR	1087.6	1099.8	1124.8	1153.5	1168.3	1177.3	1172.8	1176.2	1158.4	1149.5
SUPPORT										
ADM P ST	136.1	344.3	147.0	150.9	151.3	151.0	140.8	147.0	138.2	134.6
ADM MD	642.3	150.7	154.7	154.6	163.4	168.5	173.1	176.8	181.7	186.6
DIV DIR	8.5	9.1	9.3	9.5	9.0	10.5	10.9	11.2	11.5	11.9
A-P ADM	6.7	7.6	7.6	7.6	7.6	7.6	7.6	7.6	7.6	7.6
CHRT TRN	80.9	23.6	24.1	24.7	25.0	25.5	26.0	26.6	27.2	27.6
DIR, S&S	71.6	81.3	82.9	85.0	86.5	87.5	87.6	87.9	86.1	85.9
TOTAL SUPP	140.8	146.3	148.6	151.6	153.6	155.0	155.0	155.2	152.3	151.9
TOTAL SUPP	524.9	562.7	574.3	588.8	597.2	605.6	609.0	612.3	604.6	606.3
PRSD	20.3	20.3	20.3	20.3	20.3	20.3	20.3	20.3	20.3	20.3
PTL CAF AP	28.4	28.4	28.4	28.4	28.4	28.4	28.4	28.4	28.4	28.4
CHARTS	490.9	488.6	484.8	479.7	465.7	463.0	461.4	463.7	459.7	455.1
TOTAL	2410.1	2524.2	2612.2	2661.2	2682.2	2701.9	2702.5	2718.2	2692.8	2678.9

(F&E) as current expenses. This is consistent with annual governmental budget and appropriations cycles. Details of alternative treatments, cost projections methods and cost escalation indices are presented in Volume II [Reference 2]. The baseline projections (in constant FY76 dollars) show an increase in total costs from \$2.41 billion to \$2.89 billion over the ten year study period. The impact of increased productivity and reduced O&M costs is more pronounced in the later years and is reflected in a projection of the total cost of \$2.68 billion in FY86 under the alternative projections. The projections in current dollars range from \$2.59 billion in 1977 to \$4.69-\$5.07 billion in 1986 for the alternative and baseline projections, respectively.

### 3. COSTS INCURRED IN PUBLIC INTEREST

Before allocating the projected costs to the users of the airport and airway system, appropriate reductions should be made to reflect those costs which are incurred by FAA in the public interest. Such costs should not be allocated to the aviation users, but should be borne by the general public. In addition, it is appropriate to exclude certain directly recoverable costs from the cost base. Volume III of the series [Reference 3] presents a complete discussion of those reductions to the cost base that were made before applying the cost allocation process.

The analysis revealed that the following costs should be borne by the general public or recovered directly from specific users at the time the service is dispensed:

1. Costs of providing ATC services to support subsidized air transportation service to small communities.
2. Costs of satisfying military requirements of ATC system elements.
3. Costs of providing weather data to nonaviation users through National Oceanic and Atmospheric Administration (NOAA).
4. Costs associated with research and regulatory activities in the area of safety, medicine and environment, and certain directly recoverable related costs.
5. Costs of operating the National Capitol Airports.

The U.S. Government provides financial assistance to some air carriers to ensure adequate air service to small communities. A number of these airports currently have air traffic control towers and related terminal ATC services that would not have been provided in the absence of subsidized air service. Hence, the existence of these ATC services is directly linked to the public desire to support air service to small communities. Consequently, the costs of providing such services should be allocated to the general public

National Capitol Airports are financed through airport charges. Costs associated with their operations should be recovered from the users of those facilities and not the general users of the airport and airway system.

Tables 3-1 and 3-2 present a summary of the cost estimates of the reductions in the cost base in constant FY76 and current dollars. In constant dollars, the total reductions increase from \$395 million in 1977 to \$463 million in 1986. In current dollars, the cost estimates are \$426 million in 1977 to \$817 million in 1986. Further details are provided in Volume III of the report [Reference 3].

TABLE 3-2  
SUMMARY OF REDUCTIONS IN FAA COST BASE  
(IN MILLIONS OF CURRENT DOLLARS)

Year Elements	1977	1978	1979	1980	1981	1982	1983	1984	1985	1986
Service to Small Communities	42.1	44.7	47.2	48.9	52.8	55.7	58.7	61.8	65.3	68.8
Military Requirements	84.0	90.6	96.6	103.2	110.4	120.5	130.3	138.9	150.3	161.5
Nonaviation Use of Weather Service	26.1	28.3	30.5	32.8	35.5	38.8	42.2	46.1	50.4	54.6
Safety, Environment & Medicine	243.3	268.5	288.8	310.3	335.2	362.1	389.1	416.4	448.8	482.0
National Capital Airports	30.6	32.5	34.3	36.3	38.4	40.5	42.7	45.0	47.5	50.1
Total	426.2	464.5	497.6	532.6	572.3	617.6	663.1	708.2	762.4	817.1

#### 4. COST ALLOCATION METHOD

The selection of an appropriate cost allocation method involves issues of economic allocative efficiency, equity arguments, ability to pay, and other factors.

The 1973 Cost Allocation Study [Reference 1] analyzed ten cost allocation methods and selected a long run marginal cost approach. Under this procedure, system variable costs were allocated to the users by taking the product of their long run marginal cost (additional cost of serving one more unit of the given user class) and the activity level (number of users). The residual costs were allocated in the same proportion as the variable cost shares.

The current analysis examined alternative cost allocation methods in four broad categories: marginal/incremental cost methods, average cost methods, value of service methods, and combined methods. Details are presented in Volume IV of this series [Reference 4]. These categories included the ten methods of the 1973 study and further modifications. The best method of allocating costs to users was determined to be a hybrid of a modified long run marginal cost (LRMC) approach and engineering models. The resulting allocation assigns all airport and airway costs to users. The modification to the LRMC consisted of allocating the residual costs in inverse proportion to the users' price elasticity of demand of ATC services. This modification is related to benefits and marginal opportunity costs and has a strong theoretical support. The desirable properties of the modified LRMC can be further enhanced by substituting engineering models where econometric techniques prove unsatisfactory in providing a causal relationship between usage and costs. This aspect becomes particularly important in allocating capital expenditures in an environment of changing technology.

R&D and F&E costs were allocated to various users based on an analysis of estimated user cost responsibility of program elements appropriately aggregated to represent percentage shares of the system users for the various budget categories. This approach provided a better causal relationship than LRMC estimates of R&D and F&E cost responsibilities. O&M costs were allocated

TABLE A-2  
(CONTINUED)

ALLOCATION OF FY84 BASELINE PROGRAM COSTS  
CURRENT DOLLARS IN MILLIONS

	TOTAL	PUBLIC	A.C.	G.A.	MIL/GOVT
<b>B&amp;D</b>	817.7	2.4	73.8	28.8	12.7
<b>F&amp;E</b>	93.4	0.0	67.2	9.3	16.8
CENTERS	114.5	2.3	60.6	37.0	14.6
TOBERS	58.0	0.0	2.9	55.1	0.0
FSS	62.0	0.0	33.5	20.5	8.1
NAVAIDS	38.8	0.0	26.0	12.8	0.0
OTHER	366.7	2.3	890.2	134.8	39.5
<b>O&amp;M</b>	941.6	87.4	447.6	264.2	142.4
CENTERS	870.9	64.0	398.2	360.8	47.8
TOBERS	152.8	5.7	7.3	425.1	14.7
FSS	111.6	9.8	48.0	42.2	11.5
OTHER	2076.8	167.0	904.1	792.3	206.4
<b>SUPPORT</b>	277.5	71.0	97.5	85.7	23.4
ADM P ST	280.0	0.0	0.0	0.0	0.0
ADM MED	17.7	17.7	0.0	0.0	0.0
LEV DIR	12.0	0.0	7.7	3.0	1.3
A-P ADM	42.1	3.2	33.3	5.6	0.0
CENT TBM	152.8	39.8	54.0	46.4	12.6
DIR, S&S	266.3	47.8	112.3	83.1	23.1
TOTAL SUP	1048.4	459.4	304.7	223.8	60.4
<b>FR&amp;D</b>	32.2	32.2	0.0	0.0	0.0
<b>MTL C&amp;E AP</b>	45.0	45.0	0.0	0.0	0.0
<b>GRANTS</b>	740.0	0.0	632.9	107.1	0.0
<b>TOTAL ADJUSTMENTS</b>	4426.8	708.2	2102.7	1286.9	329.0
<b>TOTAL</b>	0.0	0.0	21.0	-72.5	51.5
<b>TOTAL</b>	4426.8	708.2	2123.7	1214.4	380.5

TABLE A-2  
(CONTINUED)

ALLOCATION OF FY82 BASELINE PROGRAM COSTS  
CURRENT COLLAS IN MILLIONS

	TOTAL	PUBLIC	A.C.	G.A.	MIL/GOVT
B&D	106.0	2.1	66.4	26.0	11.4
P&E	62.3	0.0	44.8	6.2	11.2
CENTERS	180.2	2.8	58.4	35.7	14.1
TOBRS	58.0	0.0	2.9	55.1	0.0
PSS	62.3	0.0	33.6	20.5	8.1
NAVAIDS	36.2	0.0	24.3	11.9	0.0
OTHER					
TOTAL P&E	329.0	2.1	164.0	129.5	33.4
OSH	803.7	77.0	383.1	286.8	126.8
CENTERS	738.1	56.6	340.9	297.4	43.2
TOBRS	183.7	5.1	6.9	118.0	13.7
PSS	97.9	8.8	42.1	36.4	10.6
OTHER					
TOTAL OSH	1783.3	147.6	773.0	668.5	194.2
SUPPORT	236.2	59.3	83.6	72.3	28.0
IGH	240.3	14.9	0.0	0.0	0.0
ADD P ST	84.9	0.0	6.9	2.7	1.2
ALN RED	10.8	0.0	28.7	4.8	0.0
LEV DIR	36.4	2.9	45.7	38.6	11.1
A-P ADH	831.2	35.8	96.8	70.0	20.6
CENT TEN	230.5	43.1	261.8	188.4	53.9
LIN, S&S					
TOTAL SUP	900.4	396.3	618.8	488.4	133.9
P&D	29.0	29.0	0.0	0.0	0.0
MTL CAP AP	40.5	40.5	0.0	0.0	0.0
GRANTS	675.0	0.0	577.9	97.1	0.0
TOTAL	3863.1	617.6	1843.8	1109.5	292.9
ADJUSTMENTS	0.0	0.0	18.4	-62.8	44.4
TOTAL	3863.1	617.6	1861.6	1046.7	337.3



TABLE A-2  
(CONTINUED)

ALLOCATION OF FY80 BASELINE PROGRAM COSTS  
CUMULATIVE DOLLARS IN MILLIONS

	TOTAL	PUBLIC	A.C.	G.A.	MIL/GOVT
R&D	94.9	1.9	59.5	23.2	10.2
P&E	126.0	0.0	90.7	12.6	22.7
CENTERS	413.2	1.9	60.1	36.7	44.5
TOBENS	49.0	0.0	2.5	46.6	0.0
FSS	62.5	0.0	33.7	20.6	8.1
NAVALIDS	33.3	0.0	22.3	11.0	0.0
CTBER					
TOTAL P&E	383.9	1.9	209.3	127.5	45.3
O&M	649.6	65.4	313.2	160.0	149.0
CENTERS	605.3	50.6	286.2	230.1	38.4
TOBENS	434.1	4.6	6.5	180.2	42.8
FSS	84.0	7.9	36.3	30.0	9.7
OTHER					
TOTAL O&M	1473.0	128.5	642.2	530.3	172.0
SUPPORT	492.7	50.2	68.1	56.2	18.2
ICN	202.6	202.6	0.0	0.0	0.0
ACN P ST	12.2	12.2	0.0	0.0	0.0
ACN MED	9.7	0.0	6.2	2.4	1.1
DEV DIR	38.6	2.6	25.0	4.0	0.0
A-P ADN	408.6	32.1	37.1	29.8	9.6
CENT TBN	193.6	38.6	81.3	55.7	18.1
DIR, SES					
TOTAL SUP	750.9	338.1	217.7	148.2	47.0
PR&D	26.0	26.0	0.0	0.0	0.0
NYL CAP AP	36.3	36.3	0.0	0.0	0.0
GRANTS	625.0	0.0	537.9	87.1	0.0
TOTAL	3389.9	532.6	1666.6	916.3	274.4
ADJUSTMENTS	0.0	0.0	16.7	-53.3	-36.7
TOTAL	3389.9	532.6	1683.2	863.0	347.7

TABLE B-2  
(CONTINUED)

ALLOCATION OF FY78 BASELINE PROGRAM COSTS  
CURRENT DOLLARS IN BILLIONS

	TOTAL	PUBLIC	A.C.	G.A.	MIL/GOVT
BED	85.0	1.7	53.3	20.8	9.2
PBR					
CENTERS	68.5	0.0	44.3	6.1	11.1
TOWERS	75.5	1.7	39.8	24.4	9.6
PSS	9.9	0.0	0.5	9.4	0.0
BAVAIDS	48.6	0.0	26.2	16.0	6.3
OTHER	30.1	0.0	20.2	9.9	0.0
TOTAL PBR	225.4	1.7	138.0	65.8	27.0
OSH					
CENTERS	558.3	59.8	273.3	123.9	101.2
TOWERS	504.4	43.6	241.8	184.5	34.5
PSS	122.6	4.1	6.0	100.5	11.9
OTHER	72.9	7.1	31.8	25.0	9.0
TOTAL OSH	1258.2	114.6	553.0	433.9	156.6
SUPPORT					
IGN	165.1	42.4	59.3	46.5	16.8
ADM P ST	172.4	172.4	0.0	0.0	0.0
ADM BHD	10.4	10.4	0.0	0.0	0.0
ENV DIR	8.7	0.0	5.6	2.2	1.0
A-P ADM	27.0	2.3	21.2	3.4	0.0
CHRT TRN	93.0	28.7	31.6	24.1	8.6
FIN, SES	167.4	34.5	70.6	45.9	16.4
TOTAL SUP	643.8	290.7	188.2	122.1	42.7
PRBD	23.3	23.3	0.0	0.0	0.0
MTL CAP AP	32.5	32.5	0.0	0.0	0.0
GRNTS	555.0	0.0	478.0	77.0	0.0
TOTAL ADJUSTMENTS	2823.2	464.5	1403.5	719.7	235.5
TOTAL	2823.2	0.0	14.0	-42.8	28.8
		464.5	1417.5	676.9	264.3

TABLE A-1  
(CONCLUDED)  
ALLOCATION OF FY86 BASELINE PROGRAM COSTS  
FY76 CONSTANT DOLLARS IN MILLIONS

	TOTAL	PUBLIC	A.C.	G.A.	MIL/GOVT
BED	74.3	1.5	46.6	18.2	8.0
PBR					
CENTERS	75.7	0.0	54.5	7.6	13.6
TOWERS	75.4	1.5	39.9	24.4	9.6
FSS	89.4	0.0	1.0	18.4	0.0
WAVES	40.9	0.0	22.1	13.5	5.3
CIBER	27.4	0.0	18.4	9.1	0.0
TOTAL PBR	238.8	1.5	135.8	72.9	28.5
OGN					
CENTERS	635.5	57.5	304.9	182.5	90.6
TOWERS	579.2	40.8	265.7	242.8	29.8
FSS	92.2	3.6	4.4	75.3	8.8
CIBER	72.5	6.2	31.6	27.5	7.4
TOTAL OGN	1379.4	108.1	606.6	528.3	136.4
SUPPORT					
ICN	185.8	47.9	65.8	57.3	14.8
ACN P ST	186.6	186.6	0.0	0.0	0.0
ADN MND	11.9	11.9	0.0	0.0	0.0
EVV DIR	7.6	0.0	4.9	1.9	0.8
A-P ADN	27.6	2.0	21.9	3.7	0.0
CENT TRN	104.4	25.4	36.8	31.4	8.1
DIR, SES	175.3	30.2	74.9	55.5	14.7
TOTAL SUP	696.2	303.7	204.3	149.8	38.3
PRSD	20.3	20.3	0.0	0.0	0.0
MTL CAP AP	28.4	28.4	0.0	0.0	0.0
GRNYS	455.1	0.0	388.8	66.2	0.0
TOTAL ADJUSTMENTS	2892.4	463.6	1382.1	835.4	211.3
TOTAL	2892.4	463.6	1396.0	788.2	244.7

TABLE A-1  
(CONTINUED)

ALLOCATION OF FY84 BASELINE PROGRAM COSTS  
FY76 CONSTANT DOLLARS IN MILLIONS

	TOTAL	PUBLIC	A.C.	G.A.	MIL/GOVT
B6D	74.3	1.5	46.6	18.2	8.0
F6R	59.5	0.0	42.9	6.0	10.7
CENTERS	76.2	1.5	40.4	24.7	9.7
TOWERS	48.1	0.0	2.4	39.0	0.0
FSS	43.9	0.0	23.7	14.5	5.7
MAVADS	27.4	0.0	18.4	9.1	0.0
OTHER	248.2	1.5	827.4	93.2	26.1
O6B	594.4	55.2	282.6	166.8	89.9
CENTERS	549.8	40.4	251.4	227.8	30.2
TOWERS	96.5	3.6	4.6	79.0	9.3
FSS	70.4	6.2	30.3	26.6	7.3
OTHER	1381.1	105.4	568.9	500.2	136.6
SUPPORT	875.2	44.8	61.5	54.1	14.8
ADM P ST	876.0	176.0	0.0	0.0	0.0
ADM MND	11.2	11.2	0.0	0.0	0.0
DEV DIR	7.6	0.0	4.9	1.9	0.8
A-P ADM	26.6	2.0	21.0	3.6	0.0
CEST TRN	96.5	25.1	34.0	29.3	8.0
DIR, SES	168.1	30.2	70.9	52.4	14.6
TOTAL SUP	668.9	290.0	492.4	141.3	38.2
F6ED	20.3	20.3	0.0	0.0	0.0
MTL CAF AP	28.4	28.4	0.0	0.0	0.0
GRANTS	463.7	0.0	396.5	67.1	0.0
TOTAL	2807.9	447.2	1331.8	820.0	208.9
ADJUSTMENTS	0.0	0.0	13.3	-46.1	32.8
TOTAL	2807.9	447.2	1345.1	773.9	241.7

TABLE A-1  
(CONTINUED)

ALLOCATION OF FY82 BASELINE PROGRAM COSTS  
FY76 CONSTANT DOLLARS IN BILLIONS

	TOTAL	PUBLIC	A.C.	G.A.	MIL/GOVT
BED	74.3	1.5	46.6	18.2	8.0
FEE					
CENTERS	43.4	0.0	31.2	4.3	7.8
TOURS	79.5	1.5	42.8	25.7	40.1
FSS	44.0	0.0	2.2	41.8	0.0
RAVADS	47.2	0.0	25.5	15.6	6.1
OTHER	27.4	0.0	68.4	9.1	0.0
TOTAL FEE	241.5	1.5	119.4	96.5	24.1
OSH					
CENTERS	563.6	54.0	268.7	152.0	88.9
TOURS	517.6	39.7	239.1	208.5	30.3
FSS	800.7	3.6	4.8	82.7	9.6
OTHER	68.6	6.2	29.5	25.5	7.4
TOTAL OSH	1250.6	103.5	542.1	468.8	136.2
SUPPORT					
IGR	165.7	41.6	58.6	50.7	14.7
ACH P ST	168.5	168.5	0.0	0.0	0.0
ADM BUD	80.5	80.5	0.0	0.0	0.0
FVA DIR	7.6	0.0	4.9	1.9	0.8
A-P ADM	25.5	2.0	20.1	3.4	0.0
CENT TRN	92.0	25.4	32.0	27.0	7.8
DIR, SES	861.6	30.2	67.9	49.1	14.4
TOTAL SUP	634.4	277.9	183.6	132.8	37.8
FEDD	20.3	20.3	0.0	0.0	0.0
UTL CAP AP	28.4	28.4	0.0	0.0	0.0
GRANTS	463.0	0.0	396.3	66.6	0.0
TOTAL ADJUSTMENTS	2709.5	433.8	1288.0	782.2	206.1
TOTAL	2709.5	0.0	122.9	-44.2	34.3
		433.1	1300.9	738.0	237.4

TABLE A-1  
(CONTINUED)

ALLOCATION OF FY80 BASELINE PROGRAM COSTS  
FY76 CONSTANT DOLLARS IN BILLIONS

	TOTAL	PUBLIC	A.C.	G.A.	MIL/GOVT
RED	74.3	1.5	46.6	18.2	8.0
FGE	97.7	0.0	70.4	9.8	17.6
CENTERS	90.0	1.5	47.8	29.2	14.5
TOBRS	40.4	0.0	2.0	38.4	0.0
FSS	51.5	0.0	27.6	17.0	6.7
NAVAIDS	27.4	0.0	18.4	9.1	0.0
OTHER	307.4	1.5	166.4	103.4	35.8
OGN	508.7	51.2	245.2	125.3	86.9
CENTERS	474.0	39.6	228.1	80.2	30.1
TOBRS	105.0	3.6	5.4	86.3	10.0
FSS	65.8	6.2	28.4	23.5	7.6
OTHER	9153.5	400.6	502.9	415.3	134.7
SUPPORT	150.9	39.3	53.3	44.0	14.3
ADM P ST	158.6	158.6	0.0	0.0	0.0
ADM MED	9.5	9.5	0.0	0.0	0.0
LEV DIR	7.6	0.0	4.9	1.9	0.8
A-P ADM	24.7	2.0	19.5	3.2	0.0
CEST TBN	85.0	25.1	29.4	23.4	7.5
CIB, SGS	151.6	30.2	63.7	43.6	14.2
TOTAL SUP	588.0	264.8	470.4	186.1	36.8
PRSD	20.3	20.3	0.0	0.0	0.0
MTL CAP AP	28.4	28.4	0.0	0.0	0.0
GRANTS	479.7	0.0	412.9	66.8	0.0
TOTAL	2651.3	417.4	1299.2	719.8	215.2
ADJUSTMENTS	0.0	0.0	13.0	-41.8	28.8
TOTAL	2651.3	417.4	1312.2	678.0	244.0

TABLE A-1  
(CONTINUED)

ALLOCATION OF FY78 BASELINE PROGRAM COSTS  
FY76 CONSTANT DOLLARS IN BILLIONS

	TOTAL	PUBLIC	A.C.	G.A.	MIL/GOVT
R&C	74.3	1.5	46.6	18.2	8.0
PER					
CENTERS	54.4	0.0	39.2	5.4	9.8
TOWNS	67.7	1.5	35.7	21.8	8.6
FSS	9.0	0.0	0.4	8.5	0.0
HAWAII	44.3	0.0	23.9	14.6	5.8
OTHER	27.4	0.0	18.4	9.1	0.0
TOTAL PER	202.8	1.5	117.7	59.5	24.2
OGN					
CENTERS	488.0	52.3	238.9	108.3	88.5
TOWNS	440.9	38.1	211.4	161.3	30.4
FSS	107.2	3.4	5.3	87.9	80.4
OTHER	63.7	6.2	27.8	21.8	7.9
TOTAL OGN	1099.6	100.2	483.4	379.3	136.9
SUPPORT					
ICN	444.3	37.6	51.8	40.7	14.7
ACN P ST	150.7	150.7	0.0	0.0	0.0
ACN REC	9.1	9.1	0.0	0.0	0.0
REV DIR	7.6	0.0	4.9	1.9	0.8
A-P ADP	23.6	2.0	18.6	3.0	0.0
CENT TRN	81.3	25.8	27.6	21.1	7.5
DIR, SES	146.3	30.2	64.7	40.1	14.3
TOTAL SUP	562.8	254.1	164.5	106.7	37.4
FEED	20.3	20.3	0.0	0.0	0.0
HTL CAP AP	28.4	28.4	0.0	0.0	0.0
GRANTS	488.6	0.0	420.7	67.8	0.0
TOTAL	2677.0	406.1	1232.9	631.6	206.4
ADJUSTMENTS	0.0	0.0	12.3	-37.6	25.3
TOTAL	2677.0	406.1	1245.3	594.0	231.7

## APPENDIX A

### ALLOCATION OF YEARLY PROGRAM COSTS TO USERS

The yearly allocation of program costs (R&D, F&E, O&M, etc.) for each scenario of baseline/alternative cost bases and constant/current dollars are presented in the following tables:

Table A-1: Allocation of Baseline Program Costs in Constant FY76 Dollars.

Table A-2: Allocation of Baseline Program Costs in Current Dollars.

Table A-3: Allocation of Alternative Program Costs in Constant FY76 Dollars.

Table A-4: Allocation of Alternative Program Costs in Current Dollars.



TABLE 5-3  
COST ESTIMATES OF A HYPOTHESIZED GA-ONLY SYSTEM  
(IN MILLIONS OF DOLLARS)

	1977	1978	1979	1980	1981	1982	1983	1984	1985	1986
In Constant FY76 Dollars	\$331.2	335.4	371.7	382.2	395.3	406.5	404.5	414.8	411.6	400.7
In Current Dollars	\$355.7	382.7	448.1	487.2	532.8	577.3	604.5	650.7	683.2	702.5

period in constant FY76 dollars. The ability of the system to accommodate a large relative increase in general aviation activity with little increase in costs indicates lower unit costs of ATC services to general aviation in future years.

## 5.2 Comparison with the Application of 1973 Cost Allocation Study Results

The present study allocates approximately 75% of the total FAA costs to the private sector (air carrier and general aviation). The application of the 1973 study findings also allocates about 75% to the private sector (after adjustment for the allowance of public interest costs in the 1973 study associated with safety regulations and national capitol airports). Within the costs allocated to the private sector, the relative proportions borne by air carrier and general aviation changes slightly from 63% : 37% in 1973 to 65% : 35% in the present study. Underlying these small changes in the proportional allocation is a much larger shift in the burden of unit cost allocations since the total number of general aviation operations using the ATC system has grown much more markedly than air carrier.

In the public sector, the total allocation is about 25% in both the 1973 study and the present analysis. There is, however, a substantial drop in the military share. The following factors are the major contributors to this difference:

1. In the 1973 study, there was steady decline in military costs over the years 1966-1975 with 20% being the average. This trend of decreasing military costs continues.
2. There is a decline of about 15% in military operations at FAA operated facilities between 1971 and 1981.
3. The relative magnitude of military activities to total operations show a dramatic decrease due to the projected increases in air carrier and general aviation activities. The share of military activities at FAA operated facilities has decreased by 30-60% when comparing 1971 vs. 1981 operations.

TABLE 5-2  
COST ALLOCATION SUMMARY  
CURRENT DOLLARS IN MILLIONS

	FY77	78	79	80	81	82	83	84	85	86
<b>BASELINE COSTS</b>										
Total	2587.1	2823.2	3116.8	3389.9	3647.4	3863.1	4125.8	4426.8	4752.7	5073.2
Public & Other	426.2	464.5	497.6	532.6	572.3	617.6	663.1	708.2	762.4	817.1
Air Carrier	1302.9	1417.5	1548.4	1683.3	1785.7	1861.6	1986.4	2123.8	2285.8	2448.7
General Aviation	609.9	676.8	782.9	862.9	960.5	1046.6	1118.4	1214.3	1299.6	1378.9
Military & Government	248.1	264.3	287.8	311.1	328.8	337.4	357.9	380.5	404.9	428.5
<b>ALTERNATIVE COSTS</b>										
Total	2587.1	2875.1	3152.8	3398.1	3622.5	3846.1	4044.1	4272.8	4473.3	4685.8
Public & Other	426.2	464.5	497.6	532.6	572.3	617.6	663.1	708.2	762.4	817.1
Air Carrier	1302.9	1427.3	1558.2	1664.8	1748.4	1839.3	1929.4	2038.9	2139.0	2229.6
General Aviation	609.9	715.2	806.3	893.0	982.9	1059.2	1111.0	1171.4	1208.1	1269.2
Military & Government	248.1	268.0	280.7	307.7	319.0	330.1	340.6	354.3	363.8	369.9

## 5. ALLOCATION OF COSTS TO USERS

A summary of the results of the cost allocation process is presented in Subsection 5.1, followed by a comparison with the application of the formula advanced by the 1973 study [Reference 1]. The results of the analysis of minimum general aviation airport and airway system requirements are discussed in Subsection 5.3.

### 5.1 Results of Cost Allocation for 1977-1986

Applying the selected hybrid cost allocation methodology to the projected cost bases\* results in the user cost responsibilities as summarized in Tables 5-1 and 5-2. Further details are presented in Appendix A. The 1977 allocation assigns 16% of the costs as incurred in public interest, 50% to air carriers, 24% to general aviation and 10% to military and Government. The percent distribution shows little fluctuation over the years. The general distribution is as follows:

Public	- 16-17%
Air Carriers	- 48-50%
General Aviation	- 24-27%
Military and Government	- 8-10%

It is important to note that the underlying aviation activity forecasts for 1977-1986 [Reference 10] show no increase in military activities, approximately a 30% increase in air carrier activities, and a very high increase for general aviation (40% at FSS, 55-60% at towers, over 80% at en route centers). Over the same period, the projected percent increase in cost responsibilities of general aviation is significantly lower (less than 40%). Figure 5-1 shows a graphic representation of user cost responsibilities for the ten year

---

\* Baseline projections assume existing functional and statistical relationships between system costs and aviation activity levels to continue in the future. Alternative projections account for a change in these relationships as a result of increased controller productivity reduced equipment O&M costs and increased F&E expenditures associated with planned FAA E&D products.

TABLE A-2  
(CONCLUDED)

ALLOCATION OF FY86 BASELINE PROGRAM COSTS  
CURRENT DOLLARS IN MILLIONS

	TOTAL	PUBLIC	A.C.	G.A.	MIL/GOVT
R&D	431.0	2.6	82.1	32.1	14.1
F&E	131.3	0.0	94.5	13.1	23.6
	124.9	2.5	66.1	40.4	15.9
	30.0	0.0	1.5	28.5	0.0
	63.4	0.0	34.2	20.9	8.2
	42.5	0.0	28.5	14.0	0.0
TOTAL F&E	392.1	2.5	224.9	117.0	47.8
OSH	1120.4	101.4	537.5	321.8	459.7
	1028.1	71.9	468.5	428.1	52.6
	162.5	6.3	7.7	832.8	15.6
	427.8	10.9	55.8	48.6	12.5
TOTAL OSH	2431.8	190.6	1069.4	931.3	240.4
SUPPORT	327.6	84.4	116.0	101.0	26.1
	329.0	329.0	0.0	0.0	0.0
	21.0	21.0	0.0	0.0	0.0
	13.4	0.0	8.6	3.3	1.5
	48.7	3.5	38.6	6.6	0.0
	178.7	44.3	64.9	55.4	44.2
	309.0	53.2	832.0	97.8	25.8
TOTAL SUP	1227.4	535.5	360.2	264.1	67.6
PR&D	35.9	35.9	0.0	0.0	0.0
NTL CAP AP	50.1	50.1	0.0	0.0	0.0
GRANTS	805.0	0.0	687.8	117.2	0.0
TOTAL ADJUSTMENTS TOTAL	5073.2 0.0 5073.2	817.4 0.0 817.1	2424.4 24.2 2448.7	1461.7 -82.7 1379.0	369.9 58.5 428.4

ALLOCATION OF FY78 ALTERNATIVE PROGRAM COSTS  
FY76 CONSTANT DOLLARS IN MILLIONS

A-23

TABLE A-3  
(CONTINUED)

ALLOCATION OF FY80 ALTERNATIVE PROGRAM COSTS  
FY76 CONSTANT DOLLARS IN BILLIONS

	TOTAL	PUBLIC	A.C.	G.A.	MIL/GOVT
B&D	74.3	1.5	46.6	18.2	8.0
P&E					
CENTERS	39.0	0.0	28.4	3.9	7.0
TORRES	104.0	1.5	55.3	33.8	13.3
PSS	55.0	0.0	2.7	52.2	0.0
MAVADS	94.0	0.0	50.8	31.0	12.2
OTHER	25.0	0.0	16.7	8.2	0.0
TOTAL P&E	317.0	1.5	153.7	129.2	32.6
OSH					
CENTERS	508.7	51.2	245.2	125.3	86.9
TORRES	474.0	39.6	224.4	180.2	30.1
PSS	105.0	3.6	5.1	86.3	10.0
OTHER	65.8	6.2	28.4	23.5	7.6
TOTAL OSH	1153.5	100.6	502.9	415.3	134.7
SUPPORT					
IGH	150.9	39.3	53.3	44.0	14.3
ADM P ST	158.6	158.6	0.0	0.0	0.0
ALN HED	9.5	9.5	0.0	0.0	0.0
DEV DIR	7.6	0.0	4.9	1.9	0.8
A-P ADM	24.7	2.0	19.5	3.2	0.0
CENT YRN	85.0	25.1	29.4	23.4	7.5
LIR, SES	151.6	30.2	63.7	43.6	14.2
TOTAL SUP	588.0	264.8	170.4	116.1	36.8
PM&D	20.3	20.3	0.0	0.0	0.0
MTL CAP AP	28.4	28.4	0.0	0.0	0.0
GRANTS	479.7	0.0	412.9	66.8	0.0
TOTAL ADJUSTMENTS	2661.2	417.4	1286.5	745.6	212.0
TOTAL	2664.2	0.0	12.9	-42.7	29.8
		417.4	1299.3	702.9	241.8

TABLE A-3  
(CONTINUED)  
ALLOCATION OF FY82 ALTERNATIVE PROGRAM COSTS  
FY76 CONSTANT DOLLARS IN BILLIONS

	TOTAL	PUBLIC	A.C.	G.A.	MIL/GOVT
B&D	74.3	1.5	46.6	18.2	8.0
P&E					
CENTERS	43.0	0.0	31.0	4.3	7.7
ICBERS	133.0	1.5	71.0	43.4	17.1
ISS	57.0	0.0	2.8	54.1	0.0
NAVAIDS	71.0	0.0	38.3	23.4	9.2
OTHER	29.0	0.0	19.4	9.6	0.0
TOTAL P&E	333.0	1.5	662.6	134.8	34.1
OGN					
CENTERS	522.4	54.0	243.7	184.0	80.6
TOURERS	498.3	39.7	227.9	201.8	28.9
FSS	100.7	3.6	4.8	82.7	9.6
CIBER	55.9	6.2	23.1	20.8	5.8
TOTAL OGN	1177.3	103.5	499.5	449.4	124.9
SUPPORT					
ICB	354.0	41.6	50.9	45.8	12.7
AEB P ST	168.5	168.5	0.0	0.0	0.0
AEB RED	10.5	10.5	0.0	0.0	0.0
DEV DIR	7.6	0.0	4.9	1.9	0.8
A-P ADB	25.5	2.0	20.1	3.4	0.0
CENT TRN	87.5	25.1	29.5	25.8	7.1
DIR, SES	155.0	30.2	64.0	47.4	13.4
TOTAL SUP	605.6	277.9	169.4	124.2	34.1
P&ED	20.3	20.3	0.0	0.0	0.0
MTL CAP AP	28.4	28.4	0.0	0.0	0.0
GRANTS	463.0	0.0	396.3	66.6	0.0
TOTAL ADJUSTMENTS	2701.9	433.4	1274.4	793.3	201.1
TOTAL	2701.9	0.0	12.7	-44.5	31.7
		433.1	1287.2	748.8	232.8



ALLOCATION OF 1984 ALTERNATIVE PROGRAM COSTS  
1976 CONSTANT DOLLARS IN BILLIONS

A-28

TABLE A-3  
(CONCLUDED)  
ALLOCATION OF FY86 ALTERNATIVE PROGRAM COSTS  
FY76 CONSTANT DOLLAR IN MILLIONS

	TOTAL	PUBLIC	A.C.	G.A.	MIL/GOVT
RED	74.3	1.5	46.6	18.2	8.0
FCE					
CENTERS	186.0	0.0	83.5	11.6	20.9
TOBRS	845.0	1.5	61.3	37.5	14.8
FSS	87.0	0.0	0.8	16.1	0.0
HAYARDS	62.6	0.0	33.5	20.5	8.1
CIBER	35.0	0.0	23.4	11.5	0.0
TOTAL FCE	345.0	1.5	202.6	97.2	43.7
OSH					
CENTERS	487.9	57.5	214.8	151.8	63.8
TOBRS	515.9	40.8	229.3	220.1	25.7
FSS	92.2	3.6	4.4	75.3	8.8
CIBER	53.5	6.2	21.3	21.3	4.7
TOTAL OSH	1149.5	108.1	469.8	468.5	103.1
SUPPORT					
IGH	134.6	47.9	39.1	39.0	8.6
REN P ST	886.6	186.6	0.0	0.0	0.0
APR REC	11.9	11.9	0.0	0.0	0.0
ERV DIR	7.6	0.0	4.9	1.9	0.8
A-P ADH	27.6	2.0	21.9	3.7	0.0
CENT TEN	85.9	25.1	27.9	27.0	5.9
DIR, SES	453.9	30.2	64.2	49.2	11.3
TOTAL SUP	606.3	303.7	155.0	120.9	26.7
PLED	20.3	20.3	0.0	0.0	0.0
MTL CAP AP	28.4	28.4	0.0	0.0	0.0
GRANTS	455.1	0.0	388.8	66.2	0.0
TOTAL ADJUSTMENTS	2678.9	463.6	8262.8	771.1	181.5
TOTAL	2678.9	0.0	12.6	-43.5	30.8
		463.6	1275.4	727.6	212.3

TABLE A-4  
(CONTINUED)

ALLOCATION OF FY78 ALTERNATIVE PROGRAM COSTS  
CURRENT DOLLARS IN BILLIONS

	TOTAL	PUBLIC	A.C.	G.A.	MIL/GOVT
B&D	85.0	1.7	53.3	20.8	9.2
FEI	62.1	0.0	44.7	6.2	11.2
CENTERS	84.8	1.7	44.9	27.4	10.8
TOBENS	47.1	0.0	2.4	44.8	0.0
PSS	58.8	0.0	29.6	18.1	7.1
DAVAIDS	28.5	0.0	19.1	9.4	0.0
OTHER					
TOTAL FEI	277.3	1.7	140.7	105.9	29.1
O&M	558.3	59.8	273.3	123.9	101.2
CENTERS	504.4	43.6	241.8	184.5	34.5
TOBENS	122.6	4.1	6.0	100.5	11.9
PSS	72.9	7.1	31.8	25.0	9.0
OTHER					
TOTAL O&M	1258.2	114.6	553.0	433.9	156.6
SUPPORT	165.1	42.4	59.3	46.5	16.8
ADM P ST	172.4	10.4	0.0	0.0	0.0
ADM HRD	10.4	0.0	0.0	0.0	0.0
ENV DIR	8.7	0.0	5.6	2.2	1.0
J-P ADM	27.0	2.3	24.2	3.4	0.0
CENT TRN	93.0	28.7	31.6	24.1	8.6
DIR, SES	167.3	34.5	70.5	45.9	16.4
TOTAL SUP	643.8	290.7	188.2	122.1	42.7
PR&D	23.3	23.3	0.0	0.0	0.0
MTL CAP AP	32.5	32.5	0.0	0.0	0.0
GRANTS	555.0	0.0	478.0	77.0	0.0
TOTAL ADJUSTMENTS	2875.1	464.5	1413.2	759.8	237.6
TOTAL	2875.1	0.0	14.1	-44.5	30.4
TOTAL	2875.1	464.5	1427.3	715.3	268.0

TABLE A-4  
(CONTINUED)

ALLOCATION OF FY80 ALTERNATIVE PROGRAM COSTS  
CURRENT DOLLARS IN MILLIONS

	TOTAL	FEDERAL	A.C.	G.A.	MIL/GOV'T
BEC	94.9	1.9	59.5	23.2	10.2
PGE					
CENTERS	50.3	0.0	36.2	5.0	9.0
TOWNS	130.7	1.9	69.6	42.5	16.7
PSS	66.7	0.0	3.3	63.4	0.0
NAVAIDS	104.0	0.0	61.6	37.6	14.8
OTHER	30.3	0.0	20.3	10.0	0.0
TOTAL PGE	392.0	1.9	191.0	158.5	40.6
OGH					
CENTERS	649.6	65.4	313.2	160.0	111.0
TOWNS	605.3	50.6	286.2	230.1	38.4
PSS	134.1	4.6	6.5	110.2	12.8
OTHER	84.0	7.9	36.3	30.0	9.7
TOTAL OGH	1473.0	128.5	642.2	530.3	172.0
SUPPORT					
IGH P ST	192.7	50.2	68.1	56.2	18.2
ACB BBD	202.6	202.6	0.0	0.0	0.0
LEV DIR	12.2	12.2	0.0	0.0	0.0
A-P ADH	9.7	0.0	6.2	2.4	1.4
CENT TBN	31.6	2.6	25.0	4.0	0.0
CIR, S&S	108.6	32.1	37.1	29.8	9.6
TOTAL SUP	693.6	38.6	81.3	55.7	18.1
TOTAL SUP	750.9	338.8	217.7	148.2	47.0
PRD	26.0	26.0	0.0	0.0	0.0
MTL CAP AP	36.3	36.3	0.0	0.0	0.0
GRANTS	625.0	0.0	537.9	87.1	0.0
TOTAL ADJUSTMENTS	3398.1	532.6	1648.3	987.4	269.8
TOTAL	3398.1	0.0	16.5	-54.4	37.9
		532.6	1664.8	893.0	307.7

TABLE A-4  
(CONTINUED)

ALLOCATION OF FY82 ALTERNATIVE PROGRAM COSTS  
CURRENT DOLLARS IN MILLIONS

	TOTAL	PUBLIC	A.C.	G.A.	MIL/GOVT
BED	106.0	2.1	66.4	26.0	11.4
F&E					
CENTERS	61.8	0.0	44.5	6.2	11.1
TOWERS	184.4	2.4	98.4	60.2	23.7
FSS	75.2	0.0	3.8	71.4	0.0
NAVAIDS	93.6	0.0	50.6	30.9	12.2
OTHER	38.3	0.0	25.6	12.6	0.0
TOTAL F&E	453.2	2.4	222.9	181.3	47.0
OSR					
CENTERS	744.9	77.0	347.5	205.4	115.0
TOWERS	780.5	56.6	325.0	287.8	41.2
FSS	143.7	5.1	6.9	118.0	13.7
OTHER	79.8	8.8	33.0	29.7	8.2
TOTAL OSR	1678.9	147.6	712.3	640.8	178.1
SUPPORT					
IGH P ST	245.3	59.3	72.6	65.3	18.1
ACB RED	240.3	240.3	0.0	0.0	0.0
DEV DIR	44.9	14.9	0.0	0.0	0.0
A-P ADN	10.8	0.0	6.9	2.7	1.2
CINT TBN	36.4	2.9	28.7	4.8	0.0
CIB, SES	124.8	35.8	42.0	36.8	10.2
TOTAL SUP	224.0	43.1	94.3	67.5	19.1
TOTAL SUP	863.5	396.3	241.5	177.2	48.6
FEED	29.0	29.0	0.0	0.0	0.0
MTL CAP RP	40.5	40.5	0.0	0.0	0.0
GRANTS	675.0	0.0	577.9	97.1	0.0
TOTAL ADJUSTMENTS	3846.4	617.6	1821.0	1822.4	285.1
TOTAL	3846.1	0.0	18.2	-63.1	44.9
TOTAL	3846.1	617.6	1839.3	1059.3	330.0

TABLE A-4  
(CONTINUED)

ALLOCATION OF FY84 ALTERNATIVE PROGRAM COSTS  
(CURRENT DOLLARS IN MILLIONS)

	TOTAL	FUELIC	A.C.	G.A.	MIL/GOVT
BCL	117.7	2.4	73.8	28.8	12.7
FGE	95.6	0.0	68.9	9.6	17.2
CENTERS	183.2	2.3	97.7	59.7	23.5
TCBERS	45.2	0.0	2.3	43.0	0.0
FSS	127.2	0.0	68.7	42.0	16.5
BAVAIDS	53.7	0.0	36.0	17.7	0.0
OTHER					
TOTAL FGE	504.9	2.3	273.5	171.9	57.3
OGN	819.0	87.4	373.4	239.4	118.8
CENTERS	809.9	64.0	363.2	339.0	43.6
TCBERS	152.6	5.7	7.3	125.1	14.7
FSS	81.5	9.8	32.8	31.0	7.8
OTHER					
TOTAL OGN	1863.1	167.0	776.7	734.5	184.9
SUPPOBY	232.9	71.0	74.2	70.1	17.7
ADN P ST	280.0	280.0	0.0	0.0	0.0
ACB HED	17.7	17.7	0.0	0.0	0.0
EFB DIB	12.0	0.0	7.7	3.0	1.3
A-P ADH	42.1	3.2	33.3	5.6	0.0
CENT TEN	139.3	39.8	46.3	42.6	10.6
EIB, SCS	245.9	47.8	100.4	77.5	20.1
TOTAL SUP	969.9	459.4	261.8	198.9	49.7
FEED	32.2	32.2	0.0	0.0	0.0
MYL CAF AP	45.0	45.0	0.0	0.0	0.0
GRANTS	740.0	0.0	632.9	107.1	0.0
TOTAL	4272.8	708.2	2018.7	1241.3	304.6
ADJUSTMENTS	0.0	0.0	20.2	-69.8	49.7
TOTAL	4272.8	708.2	2038.9	1171.5	354.3

TABLE A-4  
(CONCLUDED)

ALLOCATION OF FY86 ALTERNATIVE PROGRAM COSTS  
CURRENT DOLLARS IN MILLIONS

	TOTAL	PUBLIC	A.C.	G.A.	MIL/GOVT
BET	131.0	2.6	82.1	32.1	14.1
FGE	201.3	0.0	144.9	20.1	36.2
CENTERS	190.5	2.5	101.5	62.0	24.4
TOWERS	26.3	0.0	6.3	25.0	0.0
PSS	96.1	0.0	51.9	31.7	12.5
MAVADS	54.2	0.0	36.3	17.9	0.0
OTHER	568.4	2.5	336.0	156.8	73.2
TOTAL FGE	860.2	101.4	378.6	267.7	112.5
OGH	909.6	71.9	404.3	388.0	45.4
CENTERS	162.5	6.3	7.7	132.8	15.6
TOWERS	94.3	10.9	37.6	37.5	8.3
PSS	2026.6	190.6	828.2	826.0	181.7
OTHER	237.4	84.4	69.0	68.8	15.1
SUPPORT	329.0	329.0	0.0	0.0	0.0
ADM F ST	28.0	21.0	0.0	0.0	0.0
ADM HRD	13.4	0.0	8.6	3.3	1.5
ENV DIR	48.7	3.5	38.6	6.6	0.0
A-P ADM	154.5	44.3	49.2	47.6	10.4
CENT TRN	267.9	53.2	107.9	86.7	20.0
DIR, SES	1068.8	535.5	273.3	213.1	47.0
TOTAL SUP	35.9	35.9	0.0	0.0	0.0
PRSD	50.1	50.1	0.0	0.0	0.0
MTL CAP AP	805.0	0.0	687.8	417.2	0.0
GRANTS	4685.8	817.4	2207.5	1345.2	316.0
TOTAL	0.0	0.0	22.1	-75.9	53.8
ADJUSTMENTS	4685.8	817.1	2229.5	1269.3	369.8
TOTAL					

## APPENDIX B

### GLOSSARY

#### Acronym

A.C./AC	Air Carrier
A-P/AP/ARPT	Airport
AAT	FAA Air Traffic Service
ADAP	Airport Development Aid Program
ADM/ADMIN	Administration
ADV	Advisory
AFTN	Aeronautical Fixed Telecommunications Network
AOPA	Aircraft Owners and Pilots Association
ARSR	Air Route Surveillance Radar
ARTCC	Air Route Traffic Control Center
ARTS	Automated Radar Traffic Control System
ASC	Administrative Sciences Corporation
ASR	Airport Surveillance Radar
ATC	Air Traffic Control
AVP	FAA Office of Aviation Policy
C-AP	Capitol Airports
CAB	Civil Aeronautics Board (see also TRACAB)
CAP	Capitol
CENT	Centralized
CONUS	Continental United States
CSC	Computer Sciences Corporation
CTR	Center (En Route)
DCA	Washington National Airport
DCS	Data Communications System
DEV	Development
DIR	Direction
DME	Distance Measuring Equipment
DOD	Department of Defense
DOT	Department of Transportation
E&D	Engineering and Development
F ST/FLT STDS	Flight Standards
F&E	Facilities and Equipment
F,E&D	Facilities, Engineering and Development
FAA	Federal Aviation Administration
FAC	Facility



Acronym

R&D	Research and Development
R&M	Relocation and Modification
R,E&D	Research, Engineering and Development
RCAG	Remote Communications, Air to Ground
RCS	Radio Communications System
RTR	Remote Transmitter/Receiver
S.E.E.	Standard Estimate of Error
S&S	Staff and Support
SRMC	Short Run Marginal Costs
SUP	Support
TACAN	Tactical Air Navigation Aid
TCS	Technical Control Service
TR	Traffic
TRACAB	Terminal Radar Control Facility Colocated with a Control Tower
TRACON	Terminal Radar Control Facility
TRN	Training
TWEB	Transcribed Weather Broadcasts
TWR	Tower (Terminal)
U.S.	United States
UG3RD	Upgraded Third Generation
UHF	Ultra High Frequency
UNICOM	Aeronautical Advisory Station
VCS	Voice Communications System
VFR	Visual Flight Rules
VHF	Very High Frequency
VOR	VHF Omni-Range (Navigation Aid)
VORTAC	Colocated VOR and TACAN

## APPENDIX C

### REFERENCES

1. Department of Transportation, "Airport and Airway Cost Allocation Study," Part I Report, September/November 1973.
2. Fain, R. L., "Airport and Airway Cost Projections: 1977-1986, Part I: Development of FAA Costs," The MITRE Corporation, MTR-7610, Volume II, September 1977.
3. Garvett, D. S., Koenig, S. E., Scalea, J. C., Sinha, A. N., "Airport and Airway Costs Incurred in the Public Interest," The MITRE Corporation, MTR-7610, Volume III, September 1977.
4. Fain, R. L., Garvett, D. S., "Airport and Airway System Cost Allocation," The MITRE Corporation, MTR-7610, Volume IV, September 1977.
5. Sinha, A. N., "Minimum General Aviation Airport and Airway System Requirements," The MITRE Corporation, MTR-7610, Volume V, September 1977.
6. Garvett, D. S., Sinha, A. N., "Review of the 1973 Airport and Airway Cost Allocation Study," The MITRE Corporation, MTR-7610, Volume VI, September 1977.
7. Scalea, J. C., "Airport and Airway System Cost Allocation Model: Users' Manual," The MITRE Corporation, MTR-7610, Volume VII, September 1977.
8. Eskew, H. L., "Airport and Airway Cost Projections: 1977-1986, Part II: An Econometric Model for Cost Projection," Administrative Sciences Corporation, ASC-R-112, September 1977.
9. Eskew, H. L., "Airport and Airway Costs Incurred in Servicing Small Communities," Administrative Sciences Corporation, ASC-R-113, September 1977.
10. Federal Aviation Administration, "Aviation Forecasts: Fiscal Year 1977-1988," FAA-AVP-76-17, September 1976.

## TABLE OF CONTENTS

	<u>Page</u>
1. INTRODUCTION	1-1
1.1 Background	1-1
1.2 Scope	1-2
2. DEVELOPMENT OF THE COST BASE	2-1
3. COSTS INCURRED IN PUBLIC INTEREST	3-1
4. COST ALLOCATION METHOD	4-1
5. ALLOCATION OF COSTS TO USERS	5-1
5.1 Results of Cost Allocation for 1977-1986	5-1
5.2 Comparison with the Application of 1973 Cost Allocation Study Results	5-5
5.3 Impact of Minimum General Aviation Re- quirements	5-6
APPENDIX A: Allocation of Yearly Program Costs to Users	A-1
APPENDIX B: Glossary	B-1
APPENDIX C: References	C-1
APPENDIX D: Distribution List	D-1

APPENDIX D  
DISTRIBUTION LIST

MITRE METREK Library

D-12

H. Benington  
C. C. Grandy  
C. A. Zraket

<u>W20:</u>	W. Mason F. Holland	<u>W46:</u>	B. Horowitz N. Spencer
<u>W40:</u>	D. L. Bailey H. J. Kirshner J. P. Locher	<u>W47:</u>	M. E. Kay R. M. Harris J. J. Fee A. L. Haines F. X. Maginnis J. S. Matney A. N. Sinha (50) W47 Technical Staff W47 Files (2)
<u>W41:</u>	L. Culhane O. Morgenstern		
<u>W42:</u>	J. A. Varela		
<u>W44:</u>	F. Irish D. Spaeth A. Bruckheim	<u>W50:</u>	R. Pikul I. Ravenscroft
<u>W45:</u>	S. Koslow T. Garceau D. Kelliher		

FAA

John M. Rodgers (50), AVP-210, Rm. 935

SHORT FORM DISTRIBUTION

W-41, W-42, W-44, W-45, W-46

Group Leaders and Department Staff

**END**

**FILMED**

**5-85**

**DTIC**